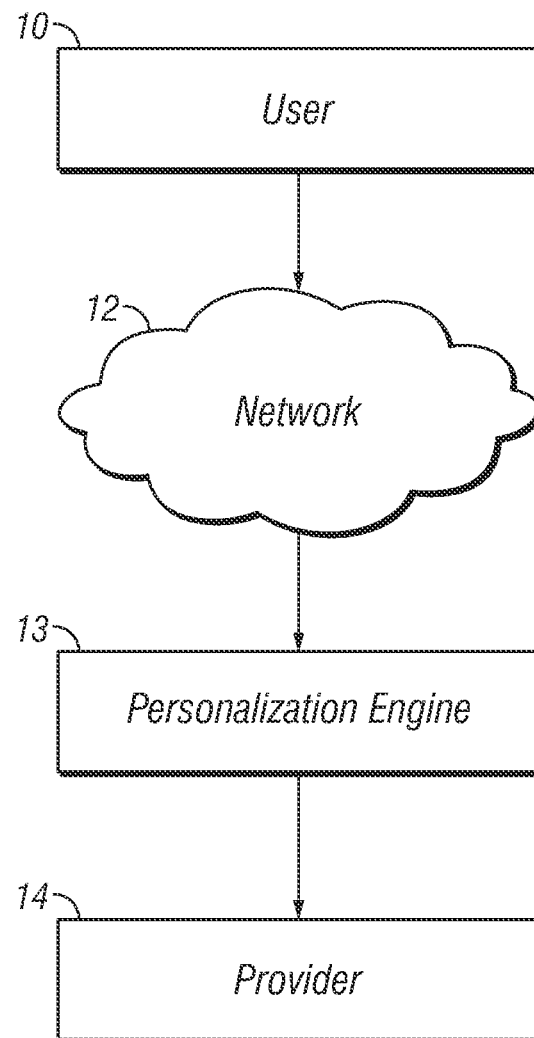


US 10,089,639 B2

Page 2

(51)	Int. Cl.			2006/0149555 A1	7/2006	Fabrizio et al.	
	G06F 17/30			2006/0167899 A1	7/2006	Nagahashi et al.	
	H04L 29/08			2006/0184410 A1 *	8/2006	Ramamurthy	G06Q 10/10 706/8
(56)	References Cited			2006/0265362 A1	11/2006	Bradford et al.	
				2007/0288454 A1 *	12/2007	Bolivar	G06Q 30/02
				2007/0288559 A1	12/2007	Parsadayan et al.	
U.S. PATENT DOCUMENTS				2008/0019500 A1 *	1/2008	Torres	H04M 3/5237 379/265.02
	7,191,129 B2	3/2007	Brown et al.	2009/0016522 A1 *	1/2009	Torres	H04M 3/42221 379/265.06
	7,464,050 B1	12/2008	Deaton et al.				
	7,464,092 B2 *	12/2008	Lee	2009/0164475 A1 *	6/2009	Pottenger	G06F 17/3089
	7,769,701 B2	8/2010	Carus et al.	2009/0326947 A1	12/2009	Arnold et al.	
	7,886,343 B2	2/2011	Sullivan et al.	2010/0057560 A1 *	3/2010	Skudlark	G06Q 30/02 705/14.49
	8,121,890 B2	2/2012	Pinhanez				
	8,170,549 B1 *	5/2012	McCorkendale	2011/0173077 A1	7/2011	Patel et al.	
	8,171,044 B2	5/2012	Daigle	2011/0179469 A1	7/2011	Blinn et al.	
	8,229,401 B2	7/2012	Elsey et al.	2011/0238410 A1	9/2011	Larcheveque et al.	
	8,326,777 B2	12/2012	Zhang et al.	2011/0282758 A1	11/2011	Jacobi et al.	
	8,370,155 B2	2/2013	Byrd et al.	2012/0069131 A1 *	3/2012	Abelow	G06Q 10/067 348/14.01
	8,411,830 B2	4/2013	Gilbert et al.				
	8,689,311 B2 *	4/2014	Blinn	2012/0166250 A1	6/2012	Ferrante et al.	
	8,798,242 B1	8/2014	Sankaranarayanan	2012/0166345 A1	6/2012	Klemm et al.	
	8,892,446 B2	11/2014	Cheyre et al.	2012/0233258 A1	9/2012	Vijayaraghavan et al.	
	9,318,108 B2	4/2016	Gruber et al.	2012/0311684 A1	12/2012	Paulsen et al.	
	2003/0038840 A1 *	2/2003	Stern	2013/0166332 A1 *	6/2013	Hammad	G06Q 40/10 705/5
				2013/0297721 A1 *	11/2013	Chen	G06F 17/30867 709/217
	2004/0064351 A1 *	4/2004	Mikurak	2013/0299569 A1 *	11/2013	Gentile	G06Q 10/08 235/375
	2005/0192792 A1	9/2005	Carus et al.	2013/0304900 A1 *	11/2013	Trabelsi	H04L 67/1057 709/224
	2005/0210016 A1	9/2005	Brunecky et al.				
	2005/0210047 A1	9/2005	Hayes et al.				
	2005/0228774 A1	10/2005	Ronnewinkel				
				* cited by examiner			

* cited by examiner

**FIG. 1**

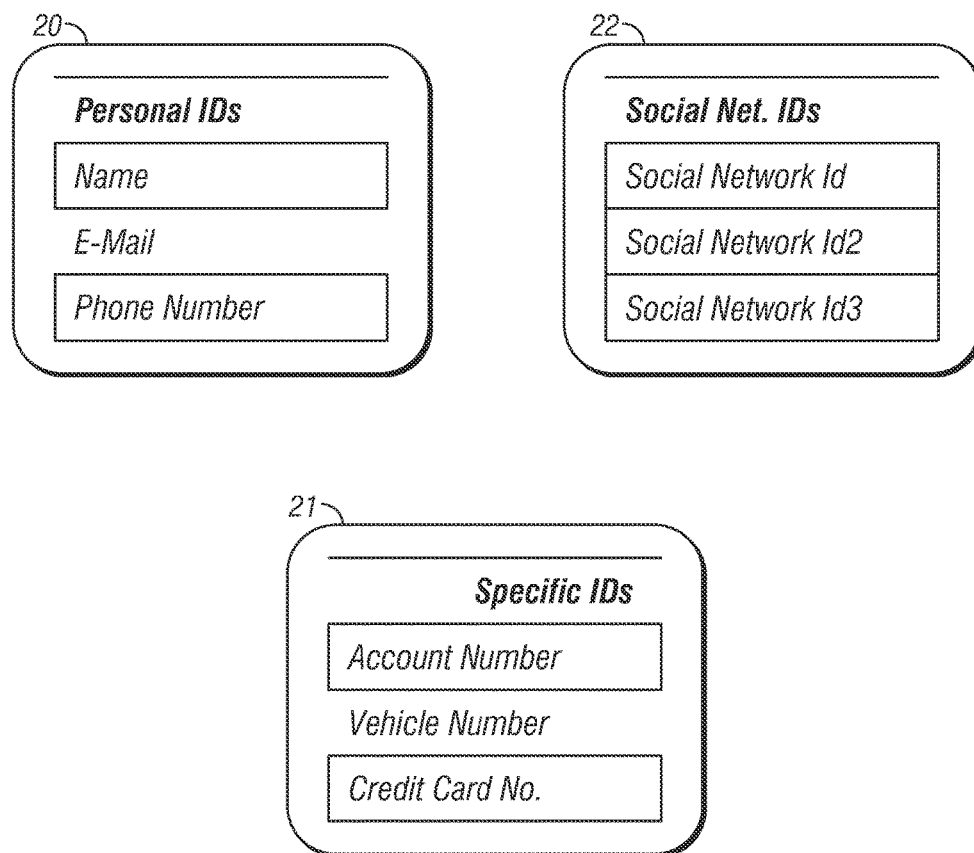


FIG. 2

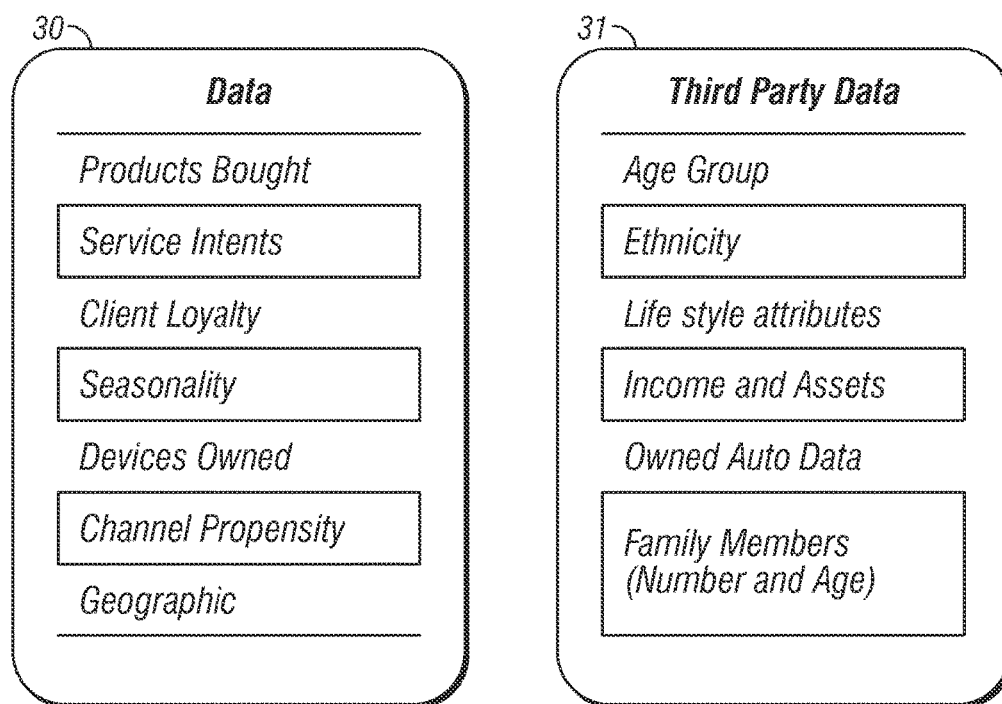


FIG. 3

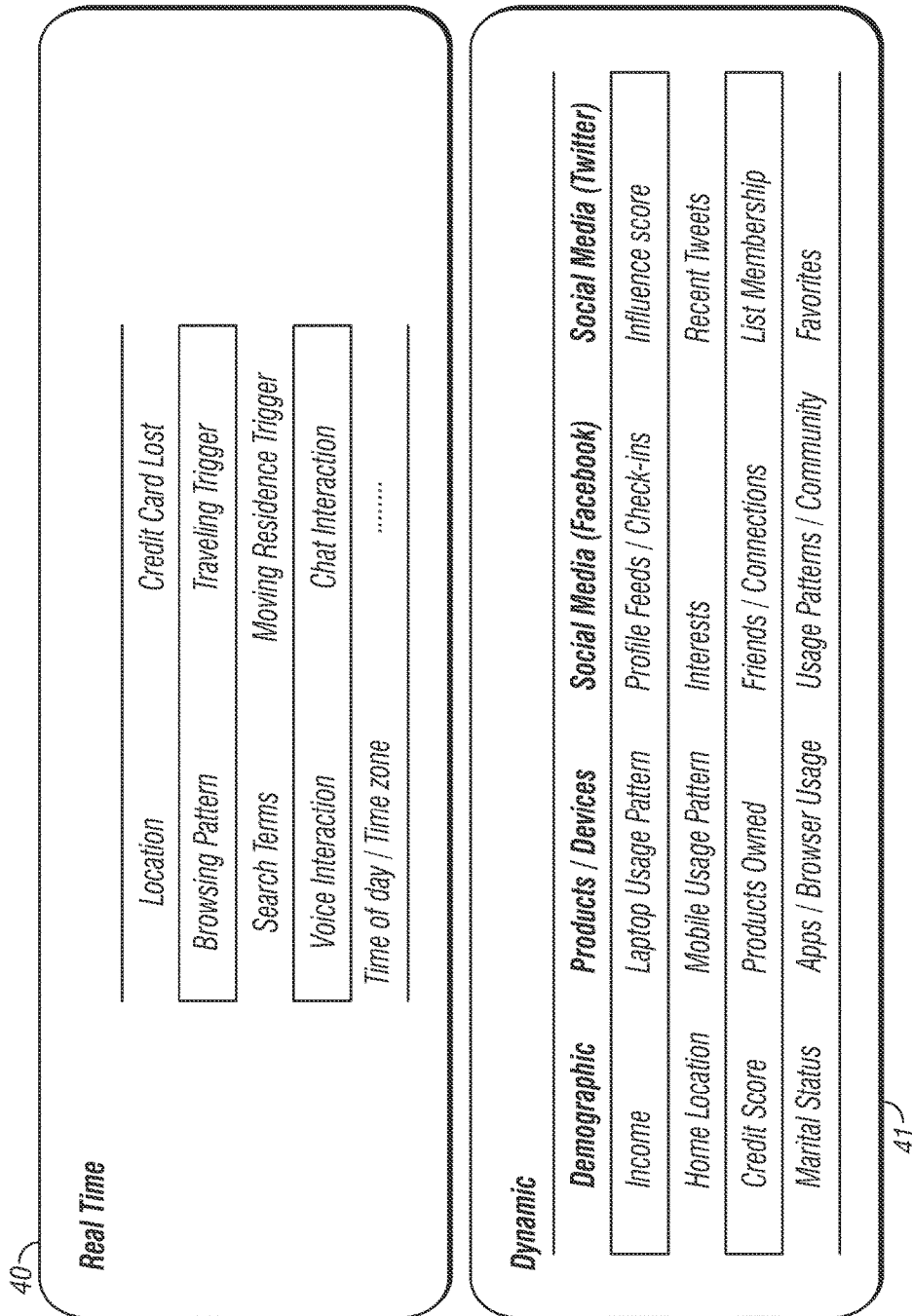
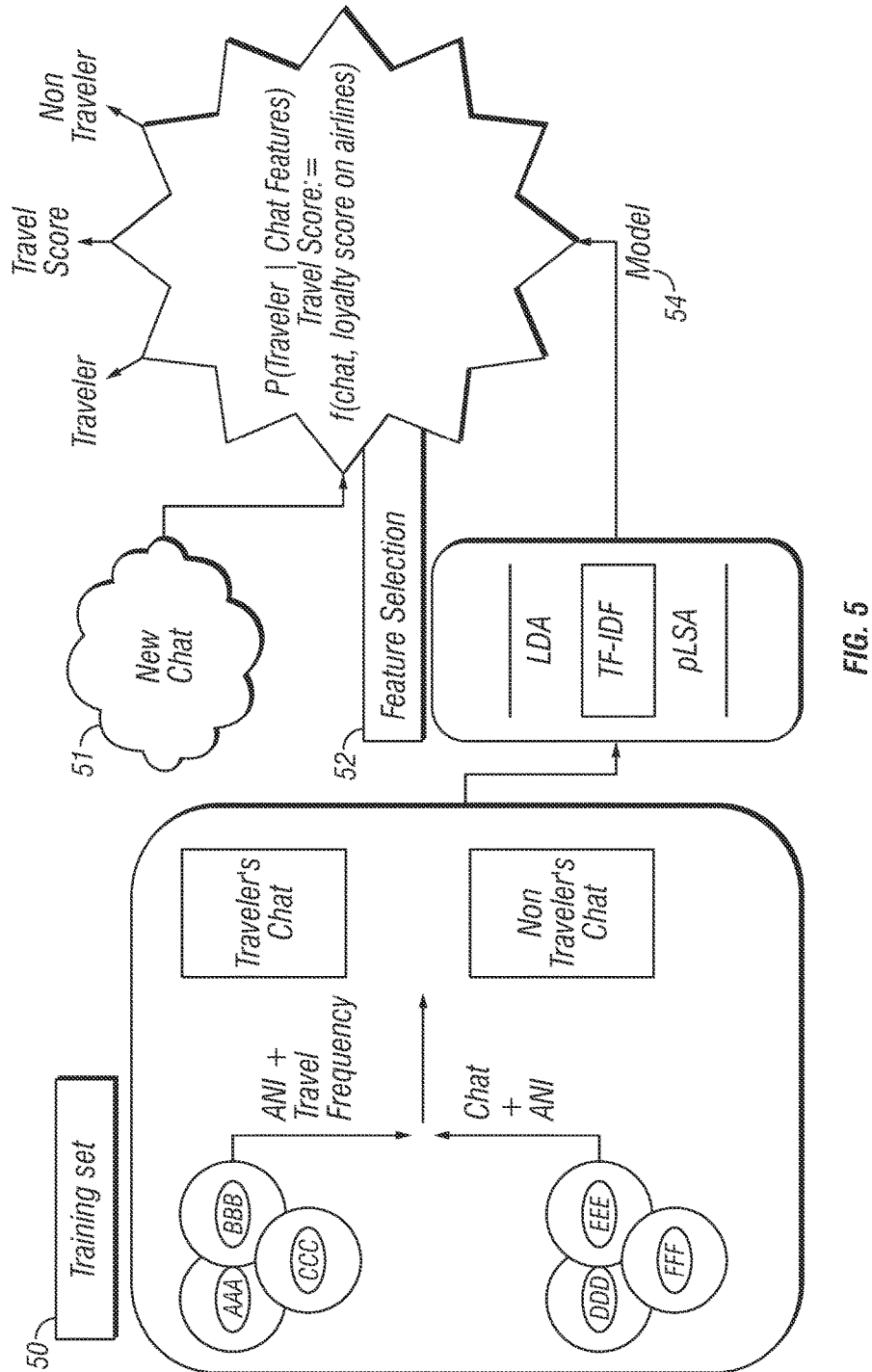


FIG. 4



<i>Attribute</i>	<i>Value/Score</i>	<i>Last Update</i>	<i>Interactions</i>	<i>Confidence</i>
<i>Chat Propensity</i>	0.5	07/01/2012	AD, SE, CA	High
<i>Call Propensity</i>	0.1	-	-	Default
<i>Travel Score</i>	0.8	01/05/2011	LE, SI, SX, EX, AV, WE	High
<i>Wealth Score</i>	0.8	07/01/2012	Third Party Data, CA	Medium
<i>Tech Savvy</i>	0.9	12/12/2007	LE Journey, BE Journey	High
<i>Price Preference</i>	0.4	10/04/2010	Se Online, OS	Medium
<i>Seasonality Score (For each season)</i>	0.6	12/06/2011	US, AV, EX	Low
<i>Office Seeker Score</i>	0.05	-	-	Default
<i>Brand Loyalty Score (Per Client)</i>	0.4	2/18/2012	VE, BB, OV	Medium
<i>Time to purchase</i>	12 days	6/03/2012	OV	Low
<i>Decisioning Behavior</i>	Variety Seeking	5/16/2012	OP, BB	Medium

FIG. 6

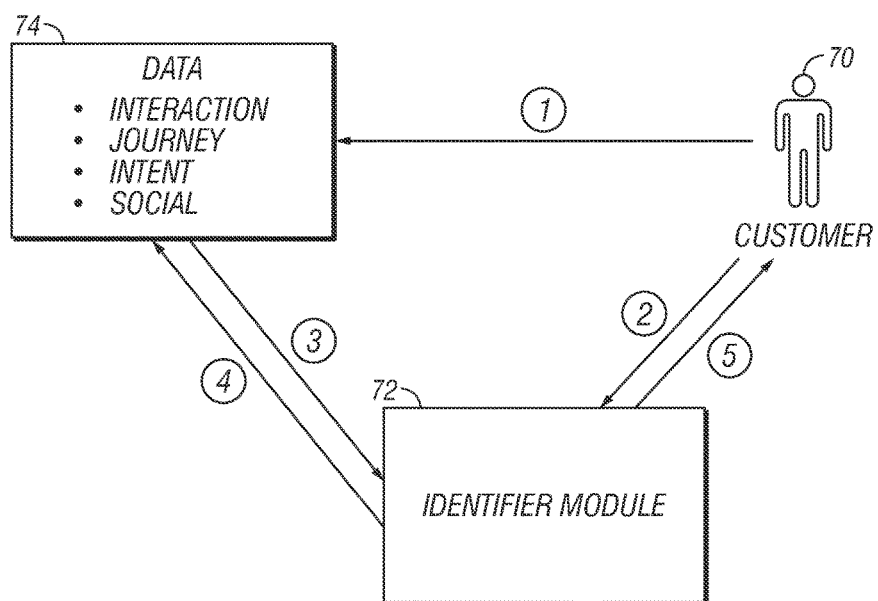


FIG. 7

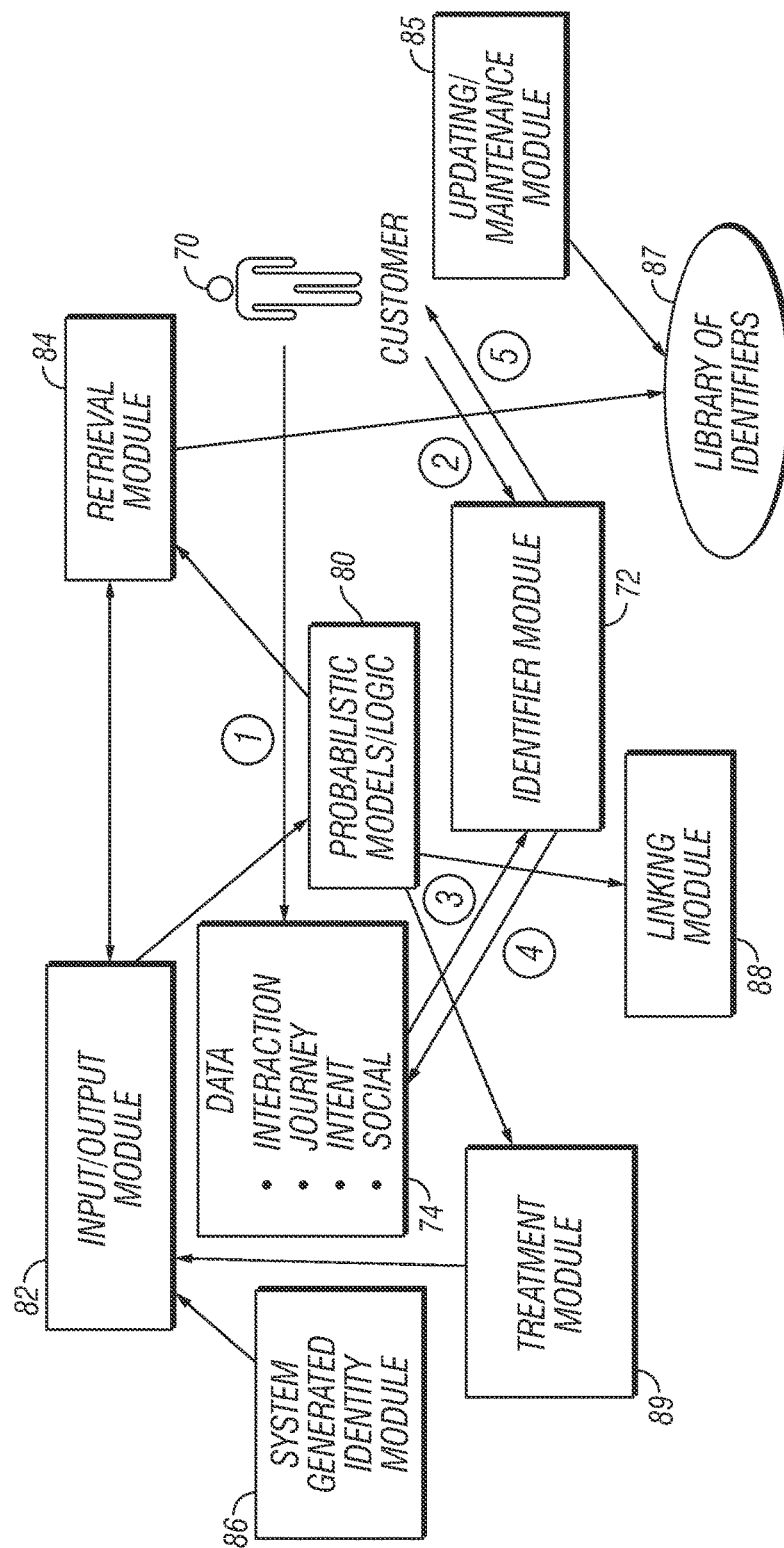


FIG. 8

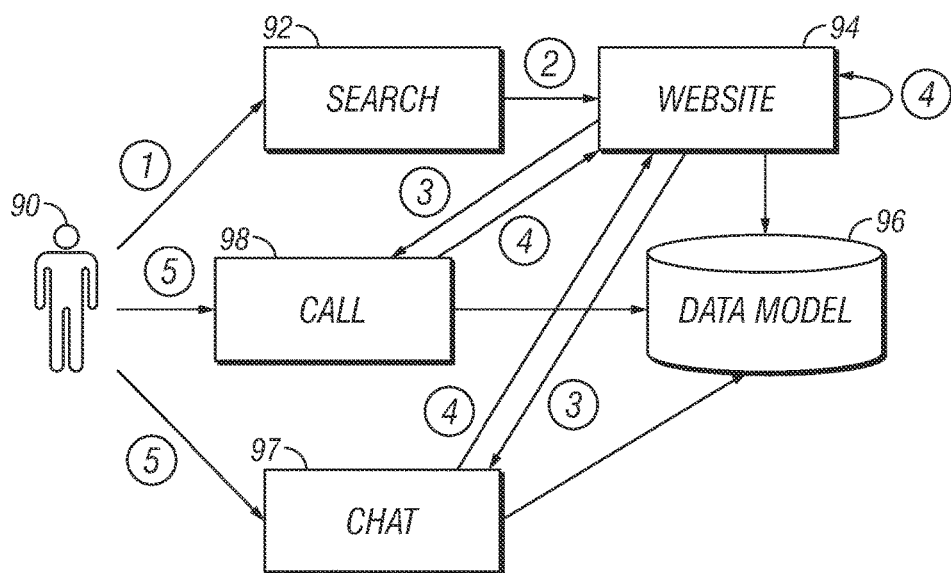


FIG. 9

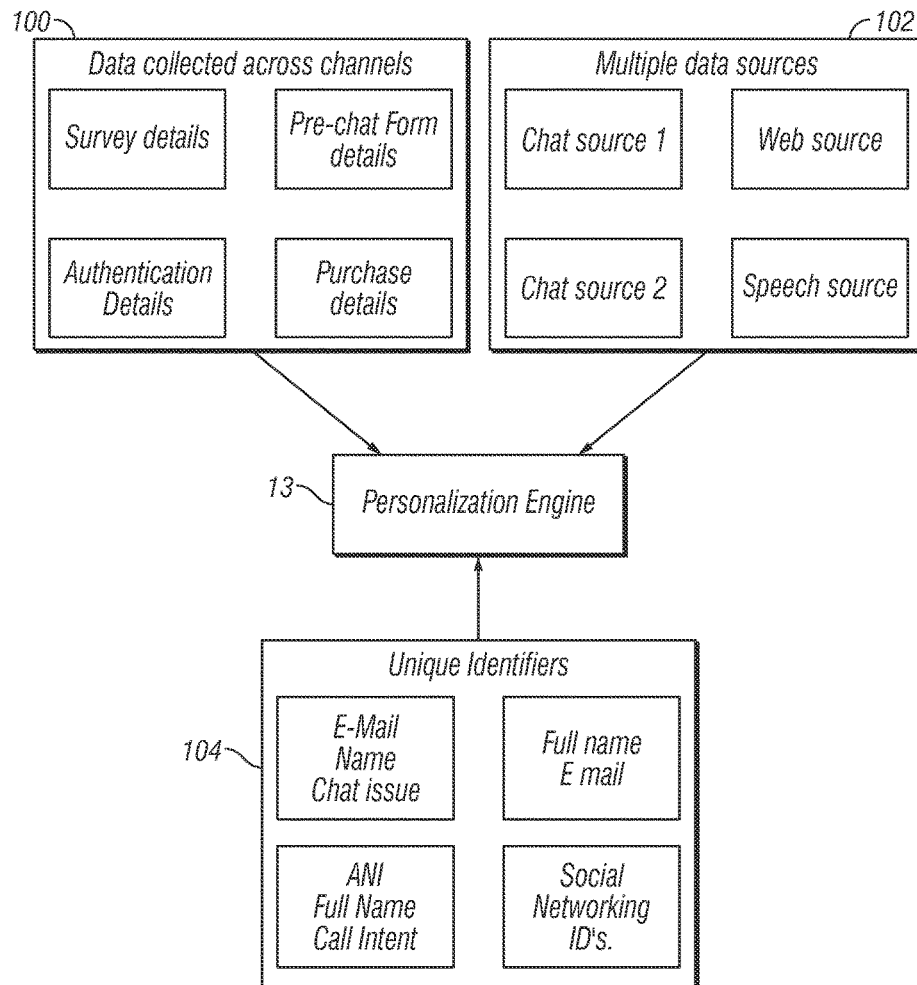


FIG. 10

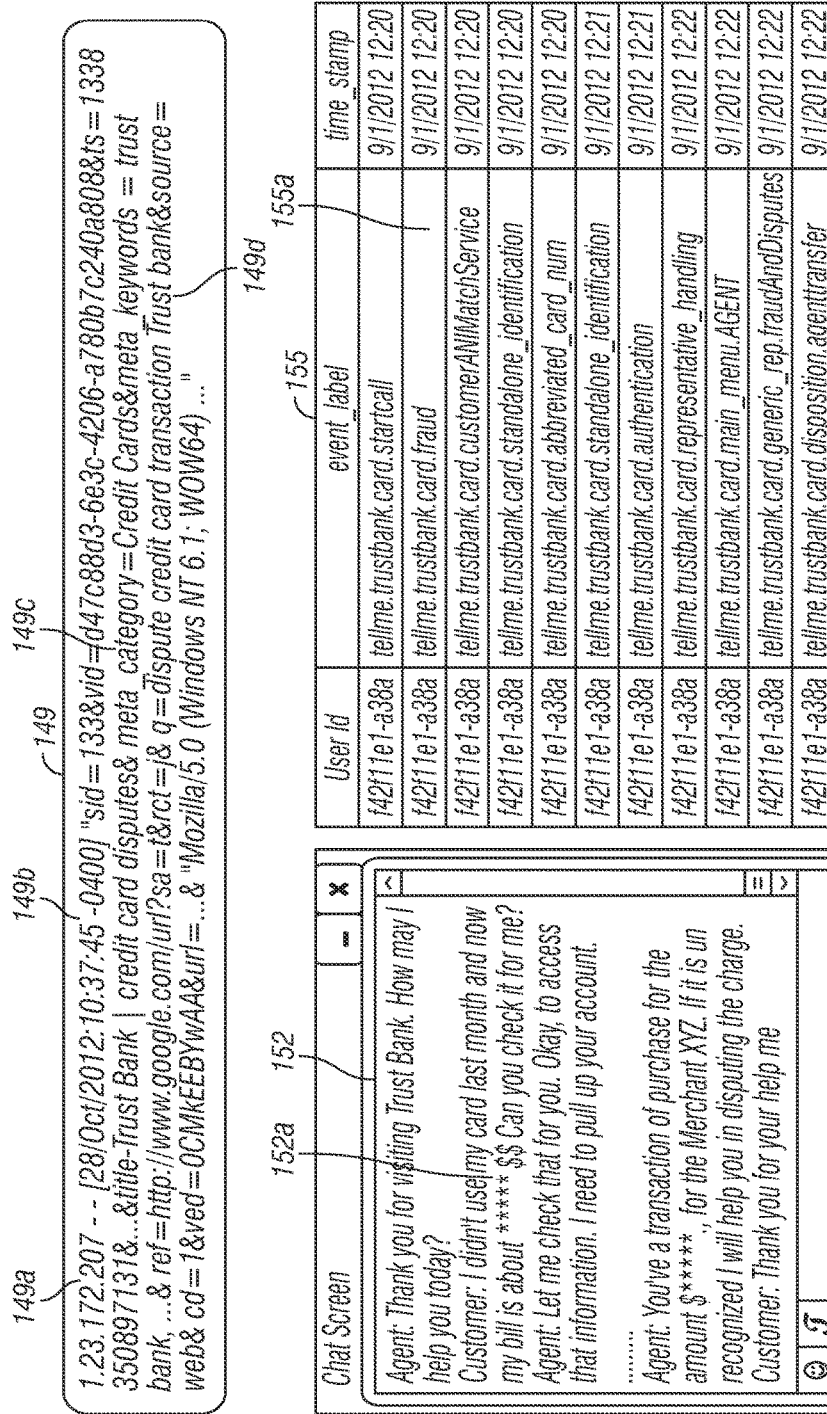


FIG. 11

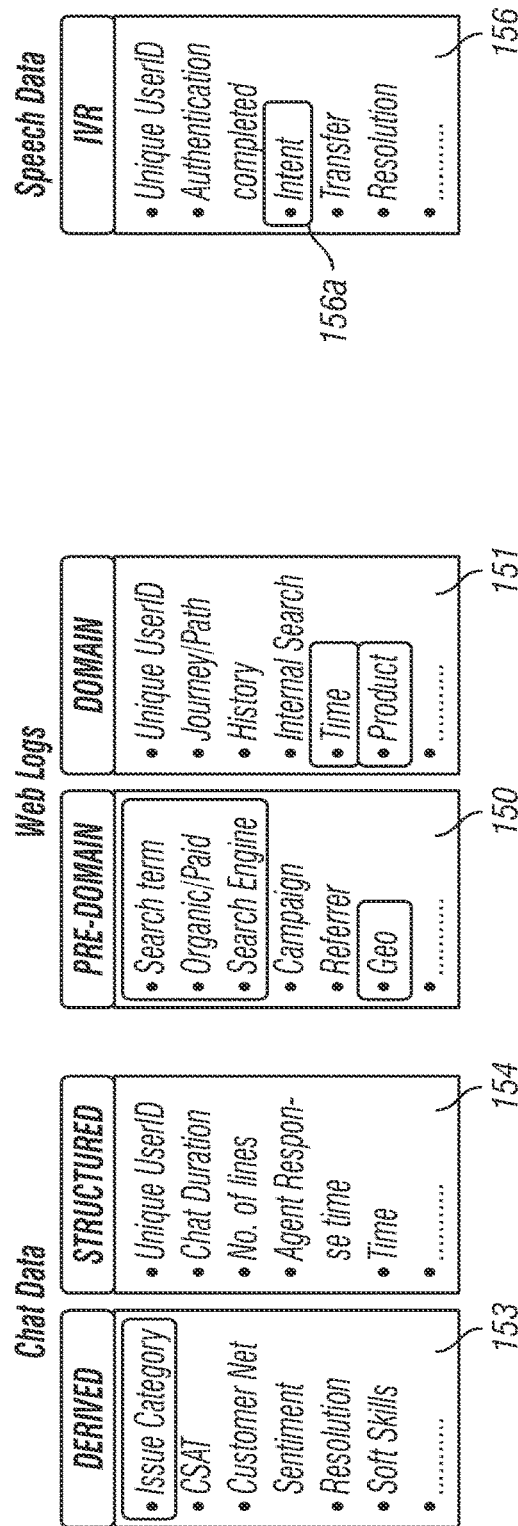


FIG. 11
(Cont'd)

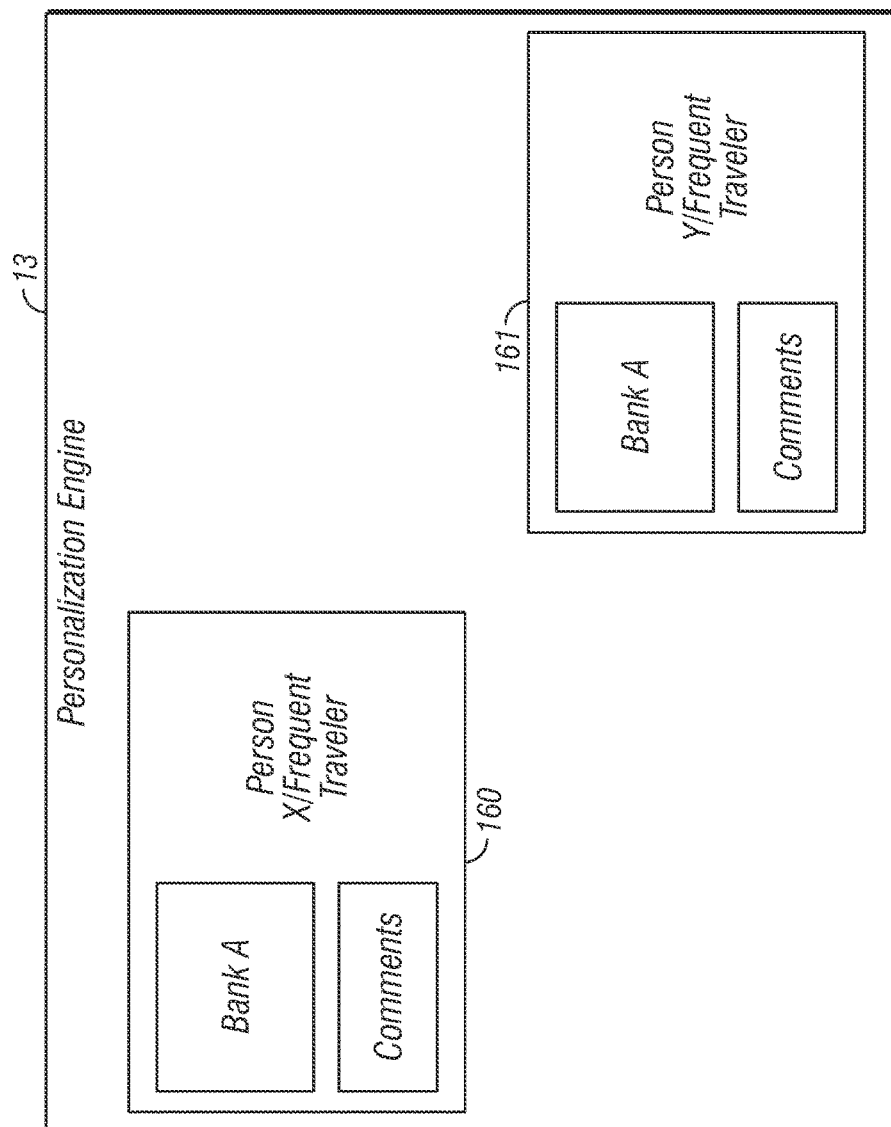
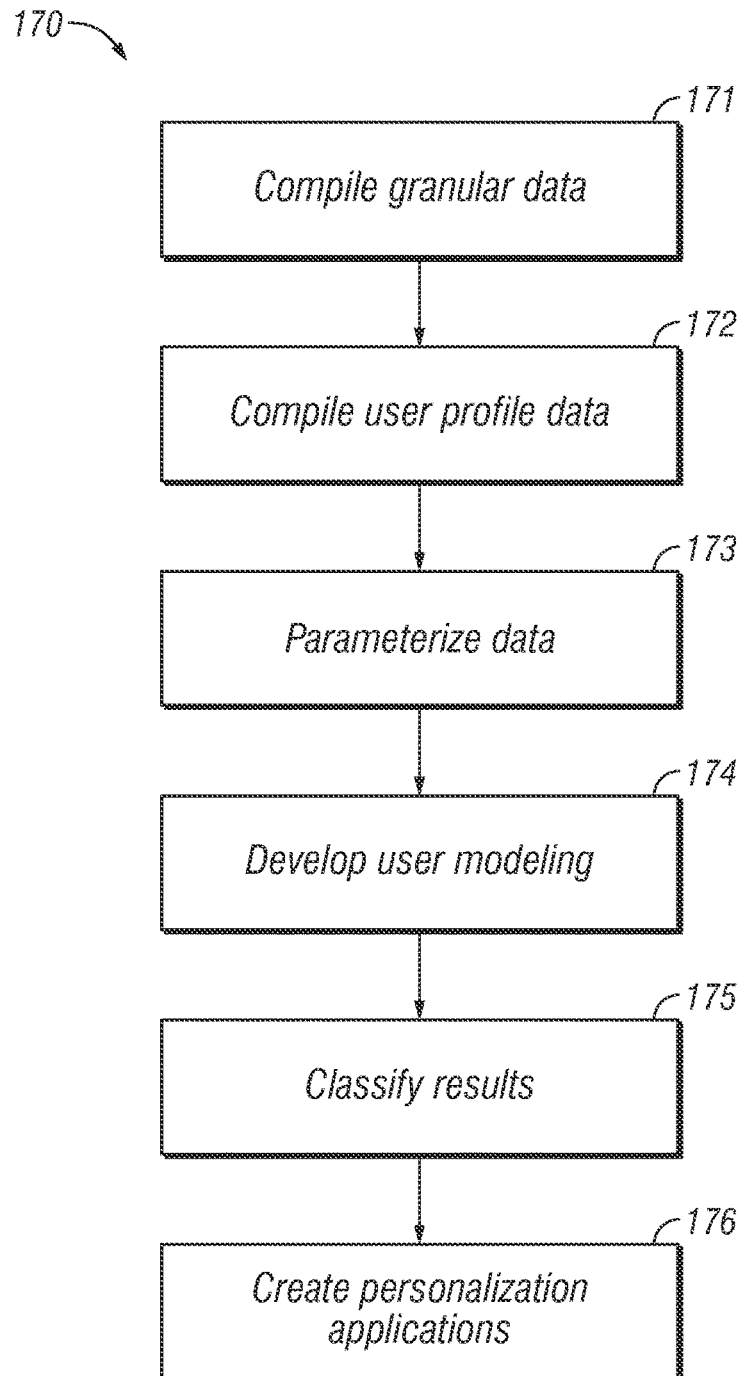


FIG. 12

**FIG. 13**

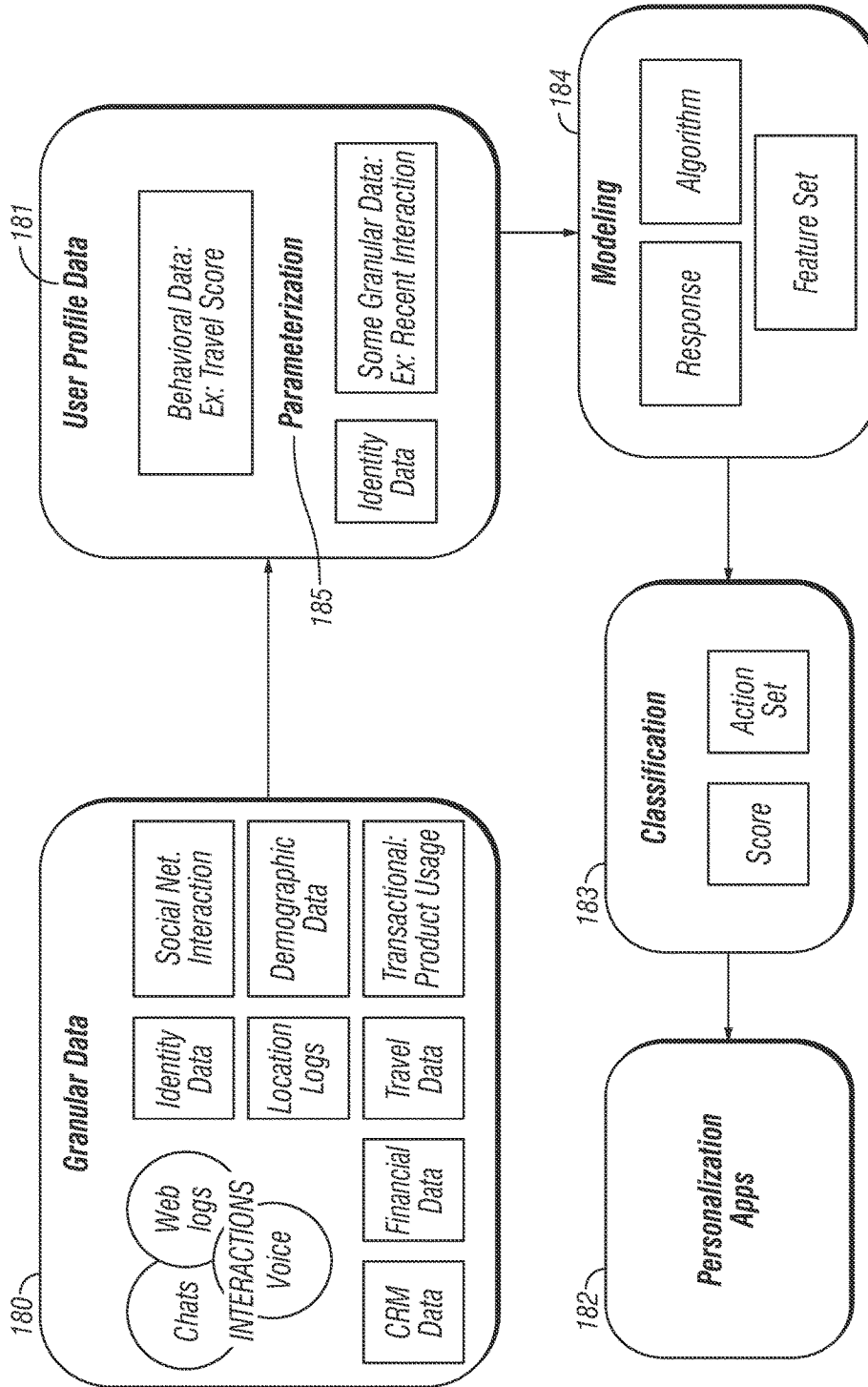


FIG. 14

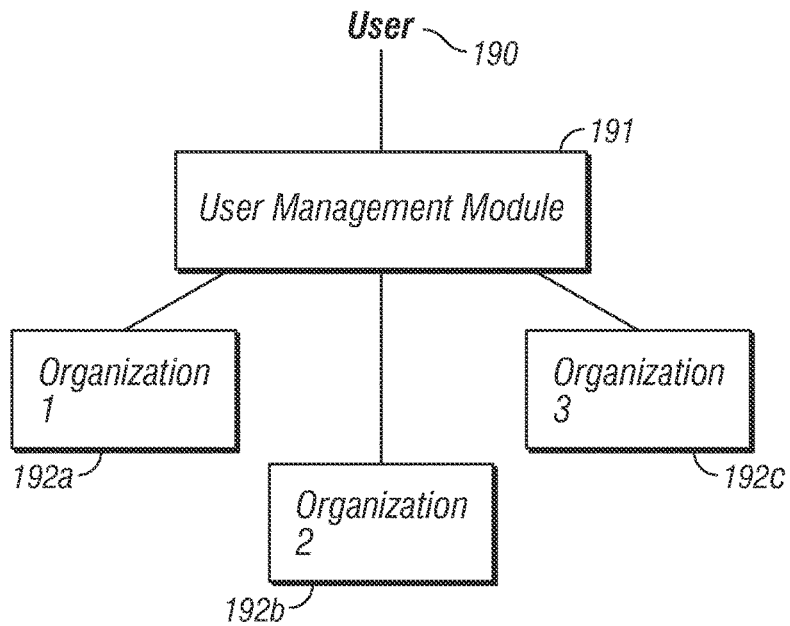


FIG. 15

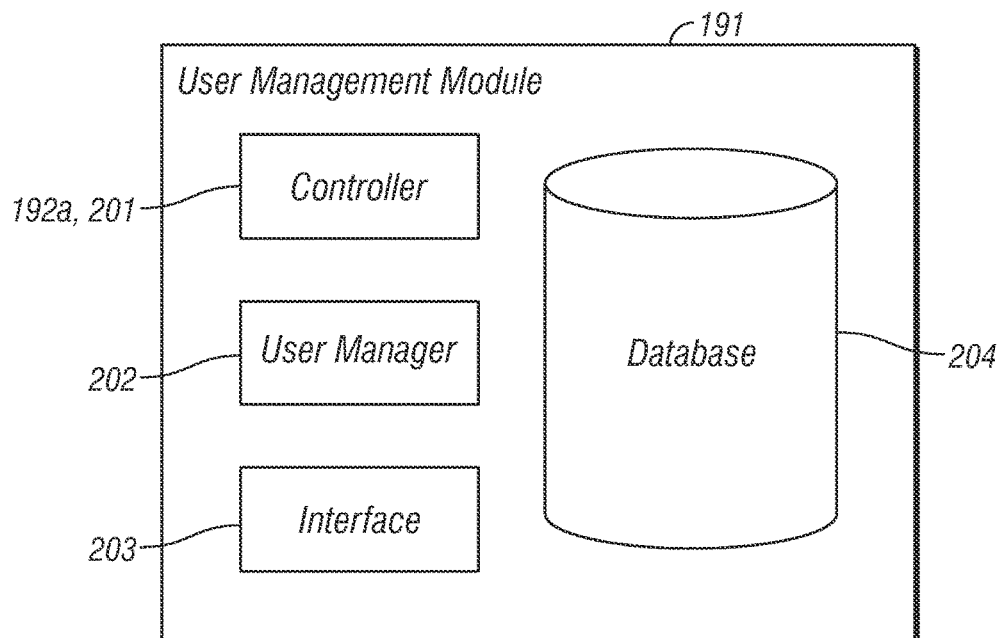
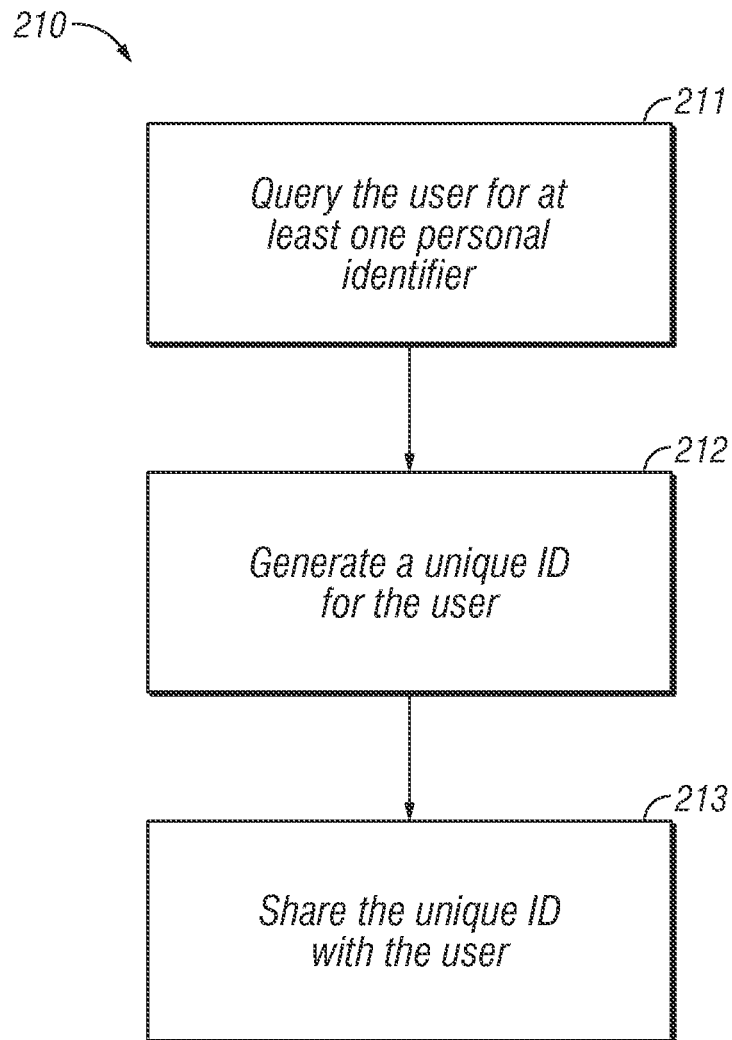


FIG. 16

**FIG. 17**

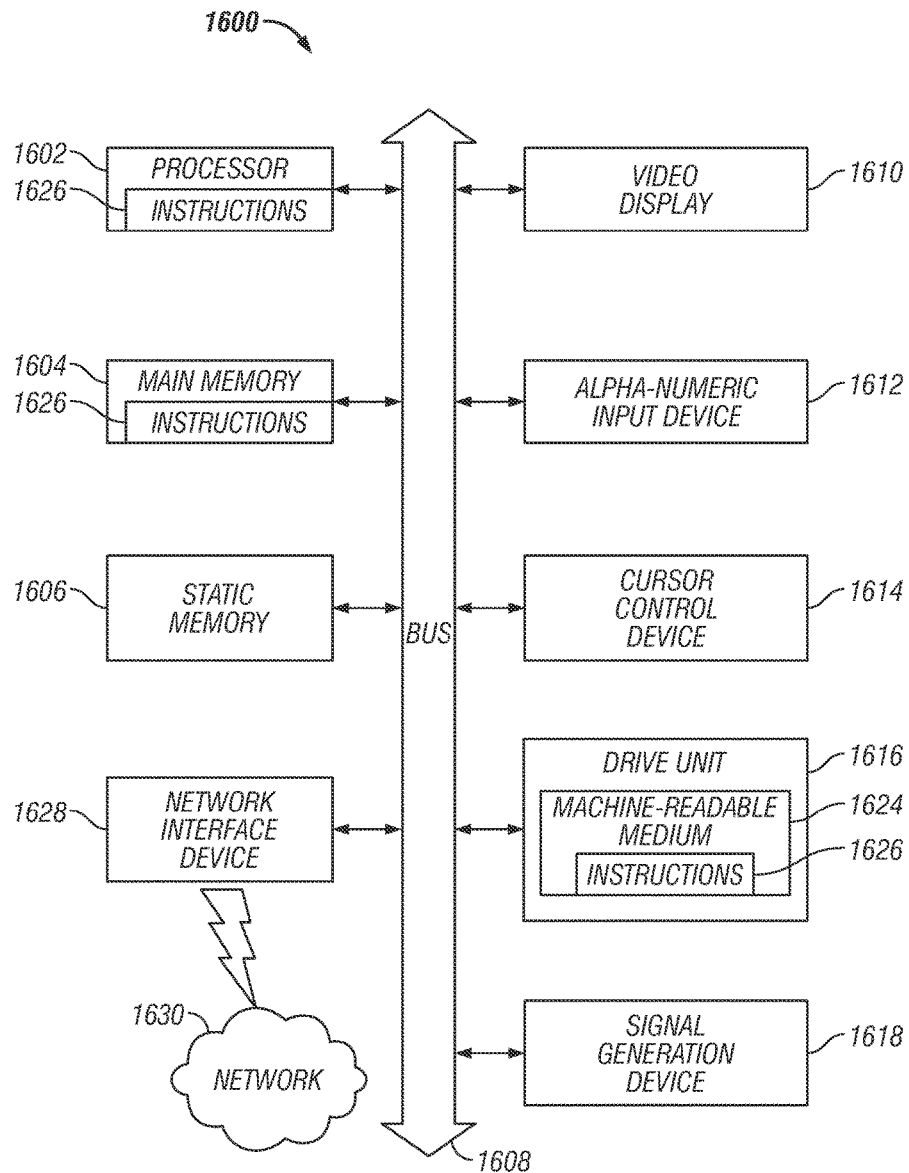


FIG. 18

1

**METHOD AND APPARATUS FOR BUILDING
A USER PROFILE, FOR PERSONALIZATION
USING INTERACTION DATA, AND FOR
GENERATING, IDENTIFYING, AND
CAPTURING USER DATA ACROSS
INTERACTIONS USING UNIQUE USER
IDENTIFICATION**

**CROSS REFERENCE TO RELATED
APPLICATIONS**

This application claims priority to U.S. provisional patent application Ser. No. 61/755,868, filed Jan. 23, 2013, and to U.S. provisional patent application Ser. No. 61/769,067, filed Feb. 25, 2013, each of which is incorporated herein in its entirety by this reference thereto.

BACKGROUND OF THE INVENTION

Technical Field

The invention relates to personalized interaction between a user and a provider of information, services, and/or goods. More particularly to creating a user profile based on user data, including interaction data, and using the same for personalization. Further, the invention relates to user interactions. In particular, the invention relates to enhancing the experience of the user during user interactions.

Description of the Background Art

User profiles can be broadly defined as a collection of various attributes of a particular person or customer. The scope of a profile depends on the nature of the company using the profile and the purpose of the user profile. A simple example is a user profile in the case of a portal which contains a login ID, a password, and preferences for the various settings that are provided to a user.

Personalization refers to the specific context within which a specific task is performed and can differ drastically from one person to another. Personalization essentially identifies the context or intent of the user and customizes the product or service that is being provided with respect to such context or intent. Personally identifiable information based modification, such as including the user's name in an online recommendation, or greeting the user with a name when the user calls an interactive voice response (IVR) system are examples of personalization.

Current techniques for creating user profiles are based on tracking user activities in different mediums on the Internet. Building a user profile for each user is essential for personalized services, such as product recommendation, proactive notifications, and personalized offers. A user profile is usually developed based on transactional data and behavioral data exhibited by the user on the Web. In certain cases, data provided by third party vendors, e.g. survey based, census based, and so on, and unstructured data, such as e-mails or posts on forums, is also used to develop user profiles.

Apart from social media, Web browsing, and offline transactions, customers also interact with the firms via instant service, chats, and telephone calls. However, gathering and using all such data for actionable outcomes poses several challenges which include, inter alia, scaling.

It would be advantageous to cover all aspects of user-related data to create a user profile and thus provide an efficient personalization technique.

Currently, a user has to interact with multiple companies and/or organizations over the course of time. Such interaction may be related to customer service issues, product information, and so on, and generally involves the user

2

having to communicate over multiple channels and/or remember user IDs associated with each company and/or organization. It is not currently possible to link user interactions effectively across multiple channels and/or multiple organizations, and then store information from these interactions in a single repository.

Thus, it would be advantageous to correlate and store all user interactions that occur across multiple channels and/or multiple organizations.

It would be further advantageous if this interaction data could be used to gain an understanding of the user, i.e. a user profile, for example to provide valuable business and analytical insights about the user including the user's intent, behavior, sentiment, and preferences and to serve the user better in a more personalized manner.

SUMMARY OF THE INVENTION

Embodiments of the invention create a user profile and provide personalization by compiling interaction data. The interaction data is compiled to generate a value index or score from a user model. The process of converting interaction data into a score and/or value index parameterizes the data. Such data is stored as parameterized data. This compiled data, referred to herein as parameterized data is, used to build tools which help decide an engagement strategy and modes of engagement with a customer. Several facets relating to the user, such as user behavior, user interests, products bought, intent, chat language, and so on, are compiled to create a user profile based personalization technique.

Embodiments of the invention also provide a unique ID that can be mapped across multiple channels for use by the user to contact various organizations across multiple channels, and thus upgrade the user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block schematic diagram showing an overall system environment according to the invention;

FIG. 2 illustrates information sources used in identifying a user by the user's unique attributes according to the invention;

FIG. 3 illustrates information sources used in gaining knowledge about the user via user-level aggregate data according to the invention;

FIG. 4 illustrates information sources used in providing personalization using recent transaction and behavioral data according to the invention;

FIG. 5 is a block schematic diagram that shows the building of a model for generating a value index score according to the invention;

FIG. 6 is a table that shows parameterizing data to behavioral scores for scalable and real time apps according to the invention;

FIG. 7 is a block schematic diagram showing customer identification according to the invention;

FIG. 8 is a block schematic diagram showing an identifier module according to the invention;

FIG. 9 is a block schematic diagram that shows multi-channel user interaction that originates with a user search according to the invention;

FIG. 10 is a block schematic diagram showing different sets of data collected according to the invention;

FIG. 11 is a screen shot showing data that can be collected across a plurality of channels according to the invention;

FIG. 12 is an illustration of a user profile mapped across channels for users having a high travel score look-alike according to the invention;

FIG. 13 is a flow diagram showing creation of a personalization application according to the invention;

FIG. 14 is a block schematic diagram showing creation of a personalization application according to the invention;

FIG. 15 is a block schematic diagram showing a network that enables a user to interact with another organization through a user management module according to the invention;

FIG. 16 is a block schematic diagram showing a user management module according to the invention;

FIG. 17 is a flow diagram showing a process for assigning a unique ID to a user according to the invention; and

FIG. 18 is a block schematic diagram showing a machine in the exemplary form of a computer system within which a set of instructions for causing the machine to perform any of the herein disclosed methodologies may be executed.

DETAILED DESCRIPTION OF THE INVENTION

Building a User Profile for Personalization Using Interaction Data

Embodiments of the invention concern building a user profile and personalization techniques. Compiling and analyzing user-related data, obtained from a variety of sources, determines the user profile and various forms of personalization. The profile is used for generating personalization services, such as product recommendations, notifications, and offers.

The personalization is based on data obtained directly from the user, purchase history, service intent, demographic data, and so on. In particular, personalization is driven by user intent, context, and information extracted from interaction data. Such interactions can occur, for example, via social media, Web browsing, and offline transactions. Users also interact with firms via instant service, chats, and telephone calls. Such interaction data is used to enrich the user's profile. Such rich data, in turn, provides better personalization. The personalization services deliver highly relevant query results, product recommendations, service offers, and so on. Results of transactions are aggregated to enhance the provision of personalization services in future transactions.

For purposes of the discussion herein, interaction refers to engagement of a user with either an agent or a system, which occurs, for example, when the user visits a website or calls or browses across channels to solve a particular issue, buy a product, etc. The interaction can span across multiple devices and multiple channels in real time, over an extended period of time, or at various intervals. For purposes of the discussion herein a channel refers to a mechanism with which user activity occurs, such as mobile apps, mobile browsing, Web browsing, speech, IVR, IM, etc.

Embodiments of the invention also address the problem of scaling. For purposes of the discussion herein, scaling refers to how all such interactions and other information can be used with reasonable resources and minimal delay in real time. Embodiments of the invention use this data specifically in the context of real time such as, for example, when the user visits the Web and then returns after two months. Using such information for personalization is not straight forward. Accordingly, the invention also provides for robust and scalable use of such interaction data.

One fundamental business objective is to convert a user searching for information pertaining to goods and services

into a purchaser of the goods and services provided by a vendor. For example, it is important to deliver the right experience to the user based on all past contexts. Embodiments of the invention personalize the user's online experience by building a user profile, and apply the user profile to one or more personalization applications by analyzing multiple data sets related to the user. The user data is collected from a variety of sources and includes unique personal identifiers, such as name, email address, and so on. In addition, aggregate data is obtained and examined including product purchase history, service requests, brand loyalty, ethnicity, and so on. The result of the data analysis is a so-called personalization engine, which is based on the user profile and which makes recommendations to the user, for example with regard to goods and services. The relevance of the recommendations is enhanced based on the personalization engine and the user profile.

FIG. 1 is a block diagram showing an overall system environment for building a user profile and applying a personalization technique by compiling and analyzing all aspects of user related data, specifically interaction data, according to the invention. As shown in FIG. 1, an embodiment of the invention comprises a network 12 and a provider 14. Different sets of data, such as unique data, aggregate data, transaction data, and interaction data comprise the data to be evaluated to generate a user profile for the user 11 with the personalization engine 13. Interaction between the personalization engine and the provider includes delivering the personalization as well as tracking the user. Functions performed include user identification; data collection; data association with the right user; extraction of relevant information from the data, i.e. attributes; conversion of attributes into user profile attributes; using the profile attributes along with present interaction data to identify various intents; based on the intents, personalizing the appropriate service; and providing the right help through the most appropriate mechanism and/or channel.

In embodiments of the invention, the user may be any of an individual, group, organization, client, server, and the like. In another embodiment of the invention, the user may communicate and/or interact through a user device. The user device may be any of a mobile phone, desktop computer, laptop, tablet, or any other device which enables the interaction.

The network may use any suitable communication technology to communicate with the user 11.

The provider 14 may be any provider of information, services, and/or goods, as well as intermediaries or other parties who do not directly provide such information, services, and/or goods to the user, but otherwise interact with those parties who do provide such information, services, and/or goods.

The personalization engine identifies a plurality of users and targets relevant content to be delivered to these users. The personalization engine provides customization of content delivery by extracting and analyzing key concepts and items of information that users make known to the provider. Further, the personalization engine tracks trends in user behavior, user interests, and technology configurations which may be tracked to identify user involvement levels and trends. Because the user profile is updated with each user interaction, the personalization engine keeps track of the evolving nature of customer intents and interests for each user over time and uses this information for personalization.

FIG. 2 illustrates information sources used in identifying a user by the user's unique attributes according to the

5

invention. As shown in FIG. 2, such information sources can include, but are not limited to, persons IDs 20, social net IDs 22 and user specific IDs 21.

FIG. 3 illustrates information sources used in gaining knowledge about the user via user-level aggregate data according to the invention. As shown in FIG. 33, such information sources can include, but are not limited to, system data 30, such as products bought, service intents, user loyalty, seasonality, device owned, channel propensity, and geographic information; and third party data 31, such as ethnicity, life style attributes, income and assets, owned auto data, and family member, e.g. number and age.

FIG. 4 illustrates information sources used in providing personalization using recent transaction and behavioral data according to the invention. As shown in FIG. 4, such information sources can include, but are not limited to, real time information 40, such as location or service specific information, e.g. with regard to a lost credit card; and dynamic information 41, such as demographics, products and/or devices, social media, e.g. Facebook and/or Twitter.

The various data elements include unique data, aggregate data, transaction data, and interaction data. Unique data corresponds to unique identification parameters of the user, such as name, e-mail ID, social networking websites ID, vehicle number, credit card number, and so on. Aggregate data relates to the user in connection with products bought, service intents, client loyalty, devices owned, channel propensity, geography, age group, ethnicity, lifestyle attributes, and so on of the user. Transaction data relates to the user's location, browsing pattern, travelling trigger, income details, marital status, laptop usage pattern, social media interests, and so on. Interaction data relates to all chatting pattern (data) and all calls of the user, as well as any other interaction that occurs between the user and the chat agent.

Each user has some identifiers that do not change much over time, such as the user's name. These are the unique attributes. Some aspects, such as age, income, etc. change with time. This is also true with behavioral aspects, such as products owned, purchases made, etc. At any given instance, the user profile is based on an aggregation across all such data for the user. The more dynamic and real time aspects are considered as transactional data.

Real-time data can consist of information which is evolving at that time period (day or hour), such as interaction in another channel. This data can be processed and included as part of the user profile aggregate data. However, for robust solution and by principle this data is preferably handled separately.

By building an accurate user profile based upon user behavior characteristics and aggregation of user data, a value index or score may be generated. All user related data is parameterized to generate behavioral scores, which is necessary for scalable and real time applications.

In embodiments of the invention, a score for user behavior characteristics may be generated by ranking procedure, statistical techniques, or any other relevant scoring method. The following two examples illustrate the principle of generating scores:

1. Purchase propensity which is a numeric value that indicates a user's tendency to buy and can be stored as a purchase score. When the user returns to a site, at any given instance, instead of examining the user's past historical data in its entirety, the parameterized information stored as the purchase score, along with evolving user behavior during the current interaction, is used to arrive at an updated purchase propensity for the user. Personalization is based

6

this score. Alternatively, in the absence of any information, a default score can be considered.

2. Wealth Score: In the absence of any information a default score is considered. Based on the user's location, identified through the user's IP address or GPS location, a particular purchasing power, e.g. income level, etc., which is similar to the purchasing power in the particular area is assigned to the user. Further, based on the user's purchases and browsing activity, and the associated cost of the purchased and/or browsed products, this score can be adjusted. For example, if a user is buying a high end product which users in the band of present associated purchasing power do not buy, the score of the user is increased. The scale of increase depends on the logic and/or algorithm employed for the purpose. The wealth score is used for personalization, such as offering products to the customer based on the purchasing power.

FIG. 5 is a block schematic diagram that illustrates a specific example of building of a model for generating a value index score according to the invention. In FIG. 5, component 50 is a training data set which comprises chat data from various organizations, and which is mapped using, for example, ANI, i.e. the user's telephone number, with call data made to various travel related organizations. If the ANI has a number of travel related calls associated with it within a band that is not too high, which indicates that the telephone belongs to a travel agent, and not too low, which indicates that the telephone belongs to a non-traveler, the associated chat is tagged as associated with traveler chat. Else, the call is a not traveler's chat. These two classifications within the training data set are used for modeling in a next component.

Component 52 is the feature extraction function, where various sets of machine learning and/or statistical models are used to extract features which differentiate a traveler chat from a non-traveler.

The functions performed by component 54, i.e. model $P(\cdot)$ & $f(\cdot)$, are derived from component 52. The core functions necessary for components 51 and 52 are included as core elements within the model.

When a new chat 51 occurs, the chat is applied to the model to identify, for example, if the user in the new chat is a frequent traveller or a non-traveller, and to provide a travel score for the user. This information is then used to personalize the user's experience.

For example, user X, user Y, and user Z are frequent users of social networking, online shopping, and banking websites. On a comparative basis, user X, user Y, and user Z are prominent users of social networking, online shopping, and banking websites, respectively. Therefore, the data obtained from the websites is parameterized to obtain a behavioral score. The value index or behavioral score of a user is based on the amount of personal information that the user has disclosed either explicitly or implicitly.

FIG. 6 is a table that shows parameterizing data to behavioral scores for scalable and real time apps according to the invention. One purpose of creating a user profile is to provide personalized services, such as product recommendation, proactive notifications, and personalized offers. Personalization typically requires some aspects of user modeling to understand the user's tastes, context, or location change. For example, based on past interactions, channel propensity can be obtained from the user and the price preference for a particular brand may be obtained from a particular interaction. Further, a default setting may be provided in the absence of a particular attribute. The parameterized data may be used to build tools which decide how and when to engage with a particular customer. Therefore, complete personalization may be achieved using real time

transaction and behavioral data, aggregate data, and unique identifiers associated with a profile. Other attributes, such as chat propensity, call propensity, travel score, wealth score, and so on are scored and given a value and/or score.

Embodiments of the invention obtain user information from one or more user journeys. Journeys can include journeys of a user's of life and the user's commercial life. A journey of life indicates major life changes of the user, such birth, going to college, marriage, shifting jobs, etc. Identifying these changes via observing appropriate triggers in accordance with embodiments of the invention opens new opportunities for promotions, up-sell, etc. A journey of commercial life occurs where the customer is in a purchase cycle, subscription cycle, loyalty cycle, etc. and may also concern, for example, the age of a device bought and when is a good time to replace the device, e.g. a cellphone upgrade cycle, etc. Tying both of these journey produces valuable information.

Embodiments of the invention also concern leveraging financial, neighborhood, and family information. The user's buying behavior is clearly dictated by income and the kind of people with whom the user interacts, e.g. family or neighbor. Models used to predict such behavior must be dynamic and must account for changing aspects of the user, such the user's financial situation. Most of the time, buying decisions are influenced by family member requirements. The neighbor and family data, indicate if a change in the purchase pattern is a permanent change in behavior or a transitory behavior.

People also prefer to use different channels when performing different tasks. Understanding this dynamic requires building channel propensity models using cross-client data. For instance, a person might use an iPhone for casual and/or quick browsing, but this person prefers bigger screen devices, such as iPad or iMac, when making a purchase. The intent of the user can also be better gauged by integrating various data sources. Unique identifiers are created, captured, and/or passed between multiple contact channels, e.g. Web, mobile, interactive voice response (IVR), phone, automotive, television, to identify and tag the user and their context, e.g. history, past behavior, steps progressed, obstacles and/or issues encountered, etc., uniquely (see commonly assigned U.S. patent application Ser. No. 13/897,233, filed May 17, 2013, which application is incorporated herein in its entirety by this reference thereto).

FIG. 7 is a block schematic diagram showing customer identification according to the invention. In FIG. 7, a customer 70 is in communication with an identifier module 72 and a data management system 74 which includes such information, for example, as the customer's interactions, journey, intent, and social actions. In operation, the customer data is stored to the data management system (1), the customer provides any inputs that are required to select an identifier (2), the data management system uses data to associate different sessions and/or journeys to select appropriate options to present to the customer (3), an identifier confidence score is associated with various journeys stored in the data management system (4), and the system provides the customer with options to select an identifier (5).

FIG. 8 is a block schematic diagram showing an identifier module according to the invention. In FIG. 8, the data system and customer access the module via an input/output module 82. A retrieval module 84 extracts a list of identities from the library of identifiers 87 to identify the customer. Interaction with the customer is effected by the probabilistic models and logic 80. The treatment module 89 provides the right option to the right customer to get the required data.

The linking module 88 links a current interaction with past interaction based upon various identifiers and data. An updating and maintenance module 85 maintains and updates the library of identifiers. The system generated identity module 86 generates customer identities when the customer is not generated by the customer.

FIG. 9 is a block schematic diagram that shows multi-channel user interaction that originates with a user query according to the invention. In FIG. 9, a user 90 posits a query (1) with a search facility 92. The search is executed (2) and the user lands at a website 94, where the user may browse. The user is offered the ability to chat or call (3) via a chat facility 97 or a phone 98, for example depending upon the options available to the user, such as VOIP or Skype. After user interaction (4) directly with the website, via a call, or via a chat session, the user resumes his journey. Thereafter, the user returns (5) via a call or chat session. All of this user interaction information is captured and processed in a data model 96.

Embodiments of the invention use customer interaction data to predict consumer behavior and build an economic portrait of the user, based on such interactions. Users routinely initiate interactions with one or more organizations, where the interactions include queries for customer service support, product information, and so on. These interaction progressions or journeys are initiated by the user across multiple channels, where the channels include one or more of Web-based techniques, including Web pages, chat, and social media; voice communication techniques, including landline, cellular, and VoIP; text-based techniques, including cellular chat and interacting with an app; and so on. The journeys can include interactions with one or more organizations. Each user interacting with the one or more organizations is assigned a unique identifier. The user information is collected from the one or more channels and the one or more organizations. The user information is stored and analyzed to determine how to serve the user better.

Users routinely interact with one or more organizations over a period of time for product information, customer service queries, and so on. The user interactions include the use of multiple channels, where the channels include voice, text, and so on, to communication with the one or more organizations. Embodiments of the invention capture user information across two or more channels or organizations. After determining a user's unique identity, e.g. user name, email address, and so on, or assigning a unique identifier to a user, user data is collected across the plurality of channels and the plurality of organizations. The user information from the one or more channels and the one or more organizations is tracked and stored in a database using the unique user identifier. The stored user data is analyzed to determine user information including user intent, behavior, sentiment, and preferences. Further, the analyzed user information is used to build, update, and modify a user profile which is related to the user's unique identifier.

In an embodiment communication or interaction may occur between the user and provider through a user and an agent, respectively. The agent may be human, automated, or any other mechanism which enables the interaction.

One goal of personalization is to create desirable perceptions and responses from the user and to encourage a user to continue contacting the provider, while avoiding undesirable perceptions that discourage users from so contacting the provider.

FIG. 10 is a block schematic diagram showing different sets of data collected according to the invention. To create a user profile, data is collected across a plurality of channels

100, multiple data sources 102, and unique identifiers 104. The creation of a user profile is a continuous process and cannot be deemed complete at any point of time. The user may be active in a variety of channels, such as social networking websites, survey websites, or browsing provider's websites. The pattern of user browsing behavior may also indicate that the user is not consistently active in all channels. In any event, data can be collected from all of the various channels on which the user is active over time to create and maintain a user profile.

The data collected across channels 100 also includes survey details, pre-chat form details, authentication details, and purchase details. The multiple data sources 102 may include data sourced from different chat clients, Web clients, and speech clients. The user data includes details, such as browsing history, flight information, shipping address, purchased items, and so on.

Making exact linkages allows for different levels of confidence based on statistical and/or probabilistic scoring of accuracy and/or certainty and unlocking different levels of access, permissions, and empowerments correlated to the level of confidence in the linkage and/or identification of the unique individual. Such approach first identifies characteristics, i.e. data, from within user behavior which can be clustered. The characteristics are used, either deterministically or probabilistically, to identify and label a unique user. A linkage of that unique user is then enabled across channels, devices, within and across sessions.

Once the system is able to track users across a session, a unique identifier can be associated with the user, for example ANIs or Web cookies can be identified as belonging to same user. In operation, the user data is stored to a data management system, the user provides any inputs that are required to select an identifier, the data management system uses data to associate different sessions and/or journeys to select appropriate options to present to the user, an identifier confidence score is associated with various journeys stored in the data management system, and the system provides the user with options to select an identifier.

For a further discussion of user context, e.g. journey, intent, actions, steps, experience to date, historical behavior, preferences, etc., as well as predictive techniques applied to such user context see, for example, commonly assigned U.S. patent application Ser. No. 13/239,195, filed Sep. 21, 2011; Ser. No. 13/349,807, filed Jan. 13, 2012; Ser. No. 13/454,726, filed Apr. 24, 2012; Ser. No. 13/461,631, filed May 1, 2012; Ser. No. 13/443,782, filed Apr. 10, 2012; Ser. No. 13/599,974, filed Aug. 30, 2012; and Ser. No. 13/852,942, filed Mar. 28, 2013, each of which application is incorporated herein in its entirety by this reference thereto.

FIG. 11 is a screen shot showing data that can be collected across a plurality of channels according to the invention. Web logs 50, 51 are sample descriptions of various attributes of the user that can be extracted from the raw data 49. Web logs fall broadly into two categories: website dependent Web logs 51 and independent Web logs 50. Independent Web logs consists of elements, such as search term; nature of search term, e.g. paid or organic, search engine, etc.; geography attributes of the user derived from the user's IP address; and so on. Dependent Web logs, among other aspects, consists of a unique identifier which helps tie the data with other sources. Dependent Web logs not only include current user Web browsing data, but also include data from previous user journeys, and ad derived attributes such as whether a search was made, whether a specific product was viewed multiple times, etc.

The chat screen 52 depicts a transcript of sample chat between an agent and the user. The example is for a transaction dispute. This intent can be derived from the highlighted text 52a.

Chat data 53, 54 are derived and structured data attributes that can be obtained from the chat transcript. Structured chat data 54, apart from the unique identifier, consists of data elements relative to the chat session, such as chat duration, number of times, variations in agent response time, etc. Derived chat data 53 consists of text based attributes, such as issues addressed during the chat, whether resolution was reached during the chat, soft skill score for the chat based on the language used in the chat, etc. For some of the attributes in the chat screen heuristics and text mining models are employed.

Semi-processed IVR logs 55 show the intent 55a of the call, which can be deciphered from speech data captured during an IVR session.

IVR data 55 is sample of data attributes associated with IVR log data. The IVR data includes a unique identifier and the call flow, based attributes such as whether authentication was completed, whether the problem was resolved, the intent of the call 56a, etc., as well as other structured attributes such as the length of the call, etc. Some of these attributes may require the use of algorithms or heuristics to extract relevant data.

The personalization engine monitors data which has been collected across various channels. The personalization engine also provides authentication and service points where it supplies portions of the related profiling and targeting process to the user. The personalization engine may attempt to help each user find certain sets of products that may be more valuable to the user amongst thousands of products. The personalization engine also seeks to determine the user's product preferences by analyzing the user's purchase behavior and product usage feedback.

When a customer visit's a website, the system knows information related to the customer's previous visits, calls, and other interactions with the system, as well as information such as purchases, etc. This information can be stored in a backend database, as well as in Web storage, such as cookies, or as a combination of both. When a customer visits, the website for the first time, a unique ID is associated with the customer. This unique ID is stored in a cookie, as well as in a backend database. Any further activity is associated with this ID, e.g. in the database or in the cookies.

In some embodiments of the invention, unique customer identification and behavior between either concurrent or sequential channels of engagement and different devices is linked, as set forth in copending, commonly assigned U.S. patent application Ser. No. 13/897,233, filed May 17, 2013, which application is incorporated herein in its entirety by this reference thereto. Linkages are created across channels and devices within the same session, as well as across sessions. These links can be made probabilistically, based on machine learning and statistical models driven by behavior and other attributes of customer journeys. Unique identifiers are created, captured, and/or passed between these multiple contact channels, e.g. Web, mobile, interactive voice response (IVR), phone, automotive, television, to identify and tag the customer and their context, e.g. history, past behavior, steps progressed, obstacles and/or issues encountered, etc., uniquely.

When a customer visit's the website, the system knows information related to the customer's previous visits, calls, and other interactions with the system, as well as information, such as purchases, etc. This information can be stored

in a back end database, as well as in Web storage, such as cookies or as a combination of both.

When a customer visits the website for the first time, a unique ID is associated with the customer. This unique ID is stored in a cookie, as well in a back end database. Any further activity is associated with this ID in the database or in the cookies. Uniquely, the nature of data includes substantially all possible interactions along with Web data, intent prediction and channel affinity predictions based on various machine learning and statistical models can be used. These help to identify the intent of the customer, as well as the right time to offer, e.g. chat.

See copending, commonly-assigned U.S. patent application Ser. No. 13/852,942, filed Mar. 28, 2013, the entirety of which is incorporated herein by this reference thereto, which provides a method and apparatus that enables identification of customer characteristics and behavior, and that predicts the customer's intent. Such prediction can be used to adopt various business strategies dynamically to increase the chances of conversion of customer interaction to a sale, and thereby increase revenue, and/or enhance the customer's experience.

To this end, intent prediction and channel affinity predictions based on various machine learning and statistical models, such as Logistic Regression, Naïve Bayes, support vector machine (SVM), and other such classifiers and other non-parametric techniques, such as K Nearest Neighbor (KNN), can be used to help identify the intent of the customer, as well as the right time to offer services to the customer, e.g. a survey.

FIG. 12 is an illustration of a user profile mapped across channels for users having a high travel score look-alike according to the invention. For example, multiple interactions through a plurality of channels are considered, such as chat, Web, and automatic number identification (ANI). Consider that user x uses DY laptop. User x reveals during a chat session that he is a frequent flyer. Therefore, user x has a high travel score. Further, user x may reveal some other information related to banking, hospitality, and so on through other mediums.

As shown in FIG. 12, consider that Person X (160) and Person Y (161) are frequent travelers in a certain airline. Based on this information, details such as the address of the user, contact details, and type of customer may be obtained. Further, person X may have made some remarks or comments regarding a product that he purchased. For example, if person X had purchased a laptop, he may comment that he travels a lot, but also uses his laptop for power computing.

This statement further ascertains the fact that person X is a frequent traveler, while also providing information on his type of laptop usage. The terms or language used by frequent travelers may also be used to develop a user model.

Further, if it is known that person Y also uses a laptop frequently while travelling, person Y may also have made some comments regarding the laptop and/or laptop usage. This information helps recommending the best products and/or offers to person X and person Y.

Although, the embodiments of the invention that are discussed herein use data obtained based on travelling patterns in a certain airline, it will be evident to a person of ordinary skill in the art that the data that is used to build a user profile and efficient personalization technique may be considered across all sets collected from a plurality of sources, including Web browsing, offline transactions, social media, and so on.

FIG. 13 is a flow diagram showing creation of a personalization application according to the invention. As shown in

FIG. 17, a method (1700) initially compiles granular data (1701). The granular data may typically constitute confidential information of the user. Granular data comprises interaction data from chats, Web logs, and voice. Granular data further comprises identity data, location logs, travel data, financial data, customer relationship management (CRM) data, demographic data, product usage, and social networking interactions.

User profile data is compiled (1702). The user profile data relates to behavioral data, identity data, and certain sets of granular data which are parameterized (1703).

User modeling is developed (1704) by using an algorithm, extracted feature sets, and responses based on the interactions.

The results based on user modeling are classified (1705) to obtain scores, action sets, and so on.

Finally a personalization application or sets of personalization applications are created (1706) based on the results. The feature selection sets for user modeling may be obtained through data mining, machine learning techniques, and the like.

Another embodiment of the invention that takes personalization outside of the interaction mediums within the provider's, or entities associated with the provider's, control provides re-targeting via various advertising mechanisms, such as Google. For example, once the user is identified as a frequent traveller, the same information can be passed to providers, such as Google, via appropriate persons and/or segmentation definitions. All such users belonging to the segment can be configured to be shown relevant ads within Google. Another embodiment of the invention can send email campaigns or offline campaigns via newsletters, etc. to target users in connection with travel related products.

In an embodiment, feature sets for user modeling may be obtained through methods such as probabilistic latent semantic analysis (PLSA) and term frequency inverse document frequency (Tf-idf) (see, for example, FIG. 5). The feature selection sets help create a user model which may, for example, predict the type of traveler, travel score, and other related features. The creation of a user profile framework enhances the user experience via a multitude of applications. By creating personalization techniques that adhere to different industry recommendations, alerts, notifications, and other features may be provided to the user.

The various actions shown in FIG. 13 may be performed in the order presented, in a different order, or simultaneously. Further, in some embodiments of the invention, some actions listed in FIG. 13 may be omitted.

FIG. 14 is a block schematic diagram showing creation of a personalization application according to the invention. In FIG. 14, granular data 180, including interactions, such as chats, web logs, and voice information, other data, such as CRM data, financial data, identity data, location logs, travel data, social network interactions, demographic data, and transactions and product usage data are used in connection with user profile data 181, such as behavioral data. Parameterization 185 of this information produces, for example, identity data and passes on some of the granular data. All such information is used in modeling 184 which applies one or more algorithms to produce a feature set and response information. The model are classified 183 to produce an action set and score, which then results in one or more personalization apps 182.

Generating, Identifying, and Capturing User Data Across Interactions Using Unique User Identification

The discussion above describes how a user profile can be built and used based upon user-related data collected across

13

different sources. Methodology for linking a user across interactions is also discussed above. However, additional methodologies are needed to build a user profile across interactions from different organizations. The following discussion addresses this aspect of the invention.

FIG. 15 is a block schematic diagram showing a network that enables a user to interact with another organization through a user management module according to the invention. As shown in FIG. 15, a user 190 interacts with at least one other organization 192a-192c through a user management module 191. The user may interact using at least one of a Web-based facility, such as a Web page, chat, social network, forum, and so on; a voice communication facility, such as a telephone line, cellular communication device, voice over Internet protocol (VoIP), and so on; and any other mode of interaction, such as a chat over a cellular communication network, interaction using an app residing on a user device, and so on. The organization may be any organization which interacts with users. The users may be another organization, a group of individuals, or a single individual. The user management module 191 is connected to the organizations 192a-192c using at least one of a Web-based facility, a voice communication, or any other mode.

In embodiments of the invention, when the user interacts with the user management module the user management module queries the user for at least one personal identifier. In another embodiment of the invention, the user management module automatically identifies at least one user identifier. The personal identifier may be at least one of the following, i.e. the user's name, user's phone number, user's email ID, and so on.

When the personal identifier is received from the user, the user management module generates a unique ID for the user. The unique ID may be at least one of a unique alphanumeric user name; a unique phone number, where the phone number is specifically assigned for use by this user across any organization and channels of communication; a unique Web link, where the Web link is specifically assigned for use by the user and the landing page of the Web link is customized for the user; and so on. The unique ID may be common for the user across all possible channels of interaction and also common across multitude of organizations with which the user interacts.

In another embodiment of the invention, the user management module may query the user regarding the type of unique ID the user desires to possess. the user management module then generates the unique ID based on the response of the user to the query.

In another embodiment of the invention, the user management module may start tracking and storing the user's journey at the time of generating and assigning a unique user ID to the user by a mechanism that includes a cookie.

Those skilled in the art will appreciate that the above functionality may be performed by another module external to the user management module and may be communicated to the user management module using suitable means.

When the user for whom a unique ID has been generated and assigned contacts the user management module, the user management module identifies the user based on the unique ID. Because the unique ID could be a unique phone number or a unique Web link, when the user contacts the user module by such modes, i.e. where the user navigates to a specific Web page or calls on his telephone, the user management module automatically identifies the user based on the mode of communications employed by the user. Alter-

14

natively, where automatic unique ID identification is not possible, the user management module may query the user to provide a unique user ID.

Once the user has been identified, the user management module queries the user regarding the service for which the user is looking, begins to track the user's interaction journey, and stores the relevant information from the journey, including time of interaction, mode of interaction, content or nature of query, user location, and the like in a data base. This information can be used for building, updating, or modifying a user profile linked to the unique ID.

The above listed embodiments are merely examples of how the user may be identified to the user management module. The person of ordinary skill in the art will appreciate that it is possible, within the scope of the invention, to use any other technique that allows the user to be identified to the user management module.

The user management module may query the user using any suitable mechanism such as, for example, an interactive voice response (IVR) system; chat session, which may be manual or automated; human agent; popup widget in a Web page; and so on.

The user may be seeking service, for example, by contacting an organization to solve an issue, to obtain answers to a query, and so on. When a response is obtained from the user, the user management module attempts to enable the user to access the service. Thus, the user management module may direct the user to the service upon checking that the appropriate contact details for the service are present within the user management module.

In another embodiment of the invention the user management module may contact directory assistance, obtain the phone number of the service, and place a telephone call to the phone number of the respective service. Once the telephone call is connected, the user management module connects the user to the telephone call.

In another embodiment of the invention, when the user connects with the user management module using the World Wide Web, after identifying the unique ID of the user and querying the user as to the service for which the user is looking, the user management module routes the user to the Web page of the service, which may be any one of a FAQ page, a help page, a chat page, a social networking page, a forum, and so on by using, for example, at least one of a popup window, a new window and/or tab in the browser this is used by the user, and a widget.

In other embodiment of the invention, the user management module may be in operative communication with a customer care center of the service that the user intend to contact. In this example, the user management module records the user journey of an interaction between the user and the customer care center of the service in a database. This information may also be used for building, updating, or modifying user profile linked to the unique ID.

In an embodiment of the invention, the user management module tracks a further journey of the user by such mechanisms as a cookie. The cookie may then be used to identify the user if the user returns to the same channel for another query.

FIG. 16 is a block schematic diagram showing a user management module according to the invention. The user management module comprises a controller 201, a user manager 202, an interface 203, and a database 204. The interface enables the user management module to communicate with the user, organizations, directory assistance, and any other external entities. The database stores data related to the user, such as at least one unique ID of the user, details

15

of interactions, queries or services accessed by the user during such interactions, feedback, and so on. The database also stores data related to organizations, such as contact details of the organizations, e.g. phone numbers, Web sites, and so on. The database may also be updated with contact details of organizations which were not previously present in the database.

When the user interacts with the controller **201**, the user manager **202** queries the user for at least one personal identifier or automatically ascertains at least one such personal identifier. On receiving or ascertaining the personal identifier from the user, the user manager generates a unique ID for the user. The unique ID may be any of a unique alphanumeric user name; a unique phone number, the phone number is specifically assigned for use by this user; a unique Web link, where the Web link is specifically assigned for use by this user, and where the landing page of the Web link may be customized for the user; and so on.

In another embodiment of the invention, at the time of generating and assigning unique user ID to the user the user controller may start tracking and storing the journey of the user via a suitable mechanism that includes a cookie.

When the user for whom a unique ID has been generated and assigned contacts the controller via the interface the controller, along with the user manager, identifies the user via the unique ID. Once the user has been identified, the user controller queries the user regarding the service for which the user is looking, begins to track user interaction journey, and stores the relevant information from the journey, including time of interaction, mode of interaction, content or nature of query, user location, and the like, in the database. This information can be used for building, updating, or modifying the user profile that is linked to the unique ID.

The controller may query the user via the interface using any suitable mechanism, such as an interactive voice response (IVR) system; chat session, which may be manual or automated; human agent; popup widget in a Web page; and so on.

When the response is obtained from the user, the controller attempts to connect the user to the service. In an embodiment of the invention, the controller directs the user to the service via the interface in a manner that is transparent to the user and the service provides the user with requested services.

Alternatively, the controller may direct the user directly to the requested services if the appropriate contact details of the service are present within the database.

In another embodiment of the invention, the controller may be in operative communication with a customer care center of the service the user intends to contact. In such case, the controller records the user's journey for interactions between the user and the customer care center of the service and stores the this information in the database. The information can be used for building, updating, or modifying user profile linked to the unique ID.

In another embodiment of the invention, the controller tracks the further journey of the user using a suitable mechanism, such as a cookie.

FIG. **17** is a flow diagram showing a process (**210**) for assigning a unique ID to a user according to the invention. When the user interacts with the user management module, the user management module queries (**211**) the user for at least one personal identifier or automatically ascertains at least one such personal identifier. The personal identifier may be at least one of the user's name, user's phone number, user's email ID, and so on.

16

Upon receiving or ascertaining the personal identifier from the user, the user management module generates (**212**) and shares a unique ID for the user. The unique ID may be any of a unique alphanumeric user name; unique phone number, where the phone number is specifically assigned for use by the user; a unique Web link, where the Web link is specifically assigned for use by the user, and the landing page of the Web link may be customized for the user; and so on. The various actions shown in FIG. **21** may be performed in the order presented, in a different order, or simultaneously. Further, in some embodiments of the invention some of the actions shown in FIG. **17** may be omitted.

Computer Implementation

The embodiments disclosed herein can be implemented through at least one software program running on at least one hardware device and performing network management functions to control the network elements. The network elements shown in the figures include blocks which can be at least one of a hardware device, or a combination of hardware device and software module.

FIG. **18** is a block schematic diagram that depicts a machine in the exemplary form of a computer system **1600** within which a set of instructions for causing the machine to perform any of the herein disclosed methodologies may be executed. In alternative embodiments, the machine may comprise or include a network router, a network switch, a network bridge, personal digital assistant, a cellular telephone, a Web appliance or any machine capable of executing or transmitting a sequence of instructions that specify actions to be taken.

The computer system **1600** includes a processor **1602**, a main memory **1604** and a static memory **1606**, which communicate with each other via a bus **1608**. The computer system **1600** may further include a display unit **1610**, for example, a liquid crystal display (LCD). The computer system **1600** also includes an alphanumeric input device **1612**, for example, a keyboard; a cursor control device **1614**, for example, a mouse; a disk drive unit **1616**, a signal generation device **1618**, for example, a speaker, and a network interface device **1628**.

The disk drive unit **1616** includes a machine-readable medium **1624** on which is stored a set of executable instructions, i.e. software, **1626** embodying any one, or all, of the methodologies described herein below. The software **1626** is also shown to reside, completely or at least partially, within the main memory **1604** and/or within the processor **1602**. The software **1626** may further be transmitted or received over a network **1630** by means of a network interface device **1628**.

In contrast to the system **1600** discussed above, a different embodiment uses logic circuitry instead of computer-executed instructions to implement processing entities. Other alternatives include a digital signal processing chip (DSP), discrete circuitry (such as resistors, capacitors, diodes, inductors, and transistors), field programmable gate array (FPGA), programmable logic array (PLA), programmable logic device (PLD), and the like.

It is to be understood that embodiments may be used as or to support software programs or software modules executed upon some form of processing core (such as the CPU of a computer) or otherwise implemented or realized upon or within a machine or computer readable medium. A machine-readable medium includes any mechanism for storing or transmitting information in a form readable by a machine, e.g. a computer. For example, a machine readable medium includes read-only memory (ROM); random access memory (RAM); magnetic disk storage media; optical storage media;

17

flash memory devices; electrical, optical, acoustical or other form of propagated signals, for example, carrier waves, infrared signals, digital signals, etc.; or any other type of media suitable for storing or transmitting information.

Although the invention is described herein with reference to the preferred embodiment, one skilled in the art will readily appreciate that other applications may be substituted for those set forth herein without departing from the spirit and scope of the present invention. Accordingly, the invention should only be limited by the Claims included below.

The invention claimed is:

1. A computer implemented method for capturing user data across interactions using a unique user identification, the method comprising:

providing a processor for implementing a user management module, said user management module receiving a request for a service from the user;

said user management module creating a plurality of linkages across a plurality of channels of interaction and a plurality of devices and within a session and across a plurality of sessions, wherein the plurality of linkages is made probabilistically based on machine learning and statistical models driven by behavior and attributes of said user's journeys on the plurality of channels including a web-based channel, a voice-based channel, and a text-based channel;

said user management module either querying said user for at least one personal identifier or automatically identifying at least one of a plurality of unique user identifiers when said user interacts with said user management module, wherein the plurality of unique user identifiers is created, captured, and passed among the plurality of channels of interaction and across a plurality of organizations with which said user interacts;

said user management module generating a unique ID for said user when said user management module receives said at least one personal identifier from the user or identifies the at least one unique user identifier, wherein said unique ID is common for said user across all of the plurality of channels of interaction;

said user management module querying said user regarding the service that said user is requesting once said user has been identified;

said user management module tracking said user's interaction journey by using the plurality of unique user identifiers to facilitate collecting data across a plurality of said channels and from a plurality of data sources, and storing relevant information of said interaction journey including any of a time of interaction, a channel of interaction, content or nature of interaction, or user location of interaction in a database;

said user management module using said relevant information of said interaction journey for any of building, updating, and modifying a continuously generated user profile that is linked to said unique ID;

evaluating said relevant information of said interaction journey stored in said user profile to personalize the service or access to the service by the user based on the user profile that is linked to said unique ID; and

said user management module routing the user to the service over one of said plurality of channels based on the user profile that is linked to said unique ID.

18

2. The method of claim 1, wherein said personal identifier comprises any of said user name, telephone number, and email ID.

3. The method of claim 1, wherein said unique ID comprises any of:

a unique alphanumeric user name;

a unique telephone number that is specifically assigned for use by said user across any organization and any channel of communication; and

a unique Web link that is specifically assigned for use by said user and wherein a landing page of said Web link is customized for said user.

4. The method of claim 1, further comprising, prior to said user management module generating said unique ID:

said user management module querying said user for a type of unique ID said user desires to possess; and

said user management module generating said unique ID in accordance with the desired type of unique ID indicated by the user in response to the query.

5. The method of claim 1, further comprising:

said user management module identifies said user based on said unique ID when said user for whom a unique ID has been generated and assigned contacts said user management module.

6. The method of claim 1, wherein said user management module queries said user by any of an interactive voice response (IVR) system, a manual or automated chat session, a human agent, and a popup widget in a Web page.

7. The method of claim 1, further comprising:

said user management module attempting to enable said user to engage with a requested service when a response is received by the user management module from the user.

8. The method of claim 1, further comprising:

said user management module checking for appropriate contact details of an organization and directing said user to said organization if said contact details are present.

9. The method of claim 1, further comprising:

said user management module contacting directory assistance, obtaining a phone number of an organization, placing a telephone call to the telephone number of an organization; and

said user management module connecting said user to said telephone call when said telephone call to said organization connected.

10. The method of claim 1, further comprising:

after identifying the unique ID of said user and querying said user as a requested service, said user management module routing said user to a Web page of an organization.

11. The method of claim 1, further comprising:

said user management module operatively communicating with a customer care center of an organization from which said user intends to request services.

12. The method of claim 11, further comprising:

said user management module recording interactions between said user and a customer service center during a user journey in a database.

* * * * *